

I CLAIM:

1. A stent-graft assembly, comprising:

a stent structure comprising a luminal surface and an abluminal surface and having at least a first radial opening and a second radial opening, said first and second radial openings extending through said stent structure between said luminal surface and said abluminal surface, wherein said first and second radial openings are spaced apart along a first direction;

a first graft layer disposed along at least a portion of said luminal surface of said stent structure thereby fully covering luminal sides of said first and second radial openings;

a second graft layer disposed along at least a portion of said abluminal surface of said stent structure thereby fully covering abluminal sides of said first and second radial openings;

a first attached area securing said first graft layer and said second graft layer together through a portion of said first radial opening, wherein a first unattached margin whereby said first and second graft layers are not secured to each other being disposed between said first attached area and an edge of said first radial opening;

a second attached area securing said first graft layer and said second graft layer together through a portion of said second radial opening, wherein a second unattached margin whereby said first and second graft layers are not secured to each other being disposed between said second attached area and an edge of said second radial opening; and

wherein said first and second unattached margins are oriented along said first direction, thereby allowing said first and second graft layers to move along said first direction relative to said stent.

2. The stent-graft assembly according to claim 1, wherein a size of said first attached area is less than a size of said first unattached margin and a size of said second attached area is less than a size of said second unattached margin.

3. The stent-graft assembly according to claim 1, wherein said first direction is axial.

4. The stent-graft assembly according to claim 1, wherein said first direction is circumferential.

5. The stent-graft assembly according to claim 1, wherein said first attached area is positioned adjacent another edge of said first radial opening and said second attached area is positioned adjacent another edge of said second radial opening, said first and second attached areas being disposed on opposite sides of said first and second radial openings, whereby said first and second graft layers are restricted from moving along a second direction relative to said stent.

6. The stent-graft assembly according to claim 5, wherein said first direction is axial and said second direction is circumferential.

7. The stent-graft assembly according to claim 1, wherein said first attached area extends peripherally all around said first attached area and said second attached area extends peripherally all around said second attached area.

8. The stent-graft assembly according to claim 7, wherein a size of said first attached area is less than a size of said first unattached margin and a size of said second attached area is less than a size of said second unattached margin.

9. The stent-graft assembly according to claim 1, wherein:
a third unattached margin whereby said first and second graft layers are not secured to each other is disposed between said first attached area and an edge of said first radial opening;

a fourth unattached margin whereby said first and second graft layers are not secured to each other is disposed between said second attached area and an edge of said second radial opening; and

said third and fourth unattached margins are oriented along a second direction, thereby allowing said first and second graft layers to move along said second direction relative to said stent, said second direction being different than said first direction.

10. The stent-graft assembly according to claim 9, wherein a size of said first attached area is less than a size of said third unattached margin and a size of said second attached area is less than a size of said fourth unattached margin.

11. The stent-graft assembly according to claim 1, wherein said first graft layer covers substantially all of said luminal surface of said stent structure and said second graft layer covers substantially all of said abluminal surface of said stent structure.

12. The stent-graft assembly according to claim 1, wherein said first and second attached areas are attached using sutures.

13. The stent-graft assembly according to claim 1, wherein said first and second attached areas are attached by thermal bonding.

14. The stent-graft assembly according to claim 1, wherein said first and second graft layers comprise a synthetic polymer.

15. The stent-graft assembly according to claim 1, wherein first and second graft layers comprise small intestine submucosa.

16. The stent-graft assembly according to claim 1, wherein said first and second attached areas are attached by thermal bonding; and said first and second graft layers comprise a synthetic polymer.

17. The stent-graft assembly according to claim 16, wherein:
a third unattached margin whereby said first and second graft layers are not secured to each other is disposed between said first attached area and an edge of said first radial opening;
a fourth unattached margin whereby said first and second graft layers are not secured to each other is disposed between said second attached area and an edge of said second radial opening; and
said third and fourth unattached margins are oriented along a second direction, thereby allowing said first and second graft layers to move along said second direction relative to said stent, said second direction being different than said first direction.

18. The stent-graft assembly according to claim 17, wherein a size of said first attached area is less than a size of said first unattached margin and a size of said third unattached margin and a size of said second attached area is less than a size of said second unattached margin and a size of said fourth unattached margin.

19. The stent-graft assembly according to claim 18, wherein said first graft layer covers substantially all of said luminal surface of said stent structure and said second graft layer covers substantially all of said abluminal surface of said stent structure.

20. The stent-graft assembly according to claim 17, wherein first and second graft layers comprise small intestine submucosa; and said first and second attached areas are attached using sutures.

21. The stent-graft assembly according to claim 20, wherein:

a third unattached margin whereby said first and second graft layers are not secured to each other is disposed between said first attached area and an edge of said first radial opening;

a fourth unattached margin whereby said first and second graft layers are not secured to each other is disposed between said second attached area and an edge of said second radial opening; and

said third and fourth unattached margins are oriented along a second direction, thereby allowing said first and second graft layers to move along said second direction relative to said stent, said second direction being different than said first direction.

22. The stent-graft assembly according to claim 21, wherein a size of said first attached area is less than a size of said first unattached margin and a size of said third unattached margin and a size of said second attached area is less than a size of said second unattached margin and a size of said fourth unattached margin.

23. The stent-graft assembly according to claim 22, wherein said first graft layer covers substantially all of said luminal surface of said stent structure and said second graft layer covers substantially all of said abluminal surface of said stent structure.

24. The stent-graft assembly according to claim 17, wherein first and second graft layers comprise small intestine submucosa; and said first and second attached areas are attached by thermal bonding.

25. The stent-graft assembly according to claim 24, wherein:
a third unattached margin whereby said first and second graft layers are not secured to each other is disposed between said first attached area and an edge of said first radial opening;

a fourth unattached margin whereby said first and second graft layers are not secured to each other is disposed between said second attached area and an edge of said second radial opening; and

said third and fourth unattached margins are oriented along a second direction, thereby allowing said first and second graft layers to move along said second direction relative to said stent, said second direction being different than said first direction.

26. The stent-graft assembly according to claim 25, wherein a size of said first attached area is less than a size of said first unattached margin and a size of said third unattached margin and a size of said second attached area is less than a size of said second unattached margin and a size of said fourth unattached margin.

27. The stent-graft assembly according to claim 26, wherein said first graft layer covers substantially all of said luminal surface of said stent structure and said second graft layer covers substantially all of said abluminal surface of said stent structure.

28. A stent-graft assembly, comprising:

a stent structure comprising a luminal surface and an abluminal surface and having at least one radial opening extending through said stent structure between said luminal surface and said abluminal surface;

a first graft layer of small intestine submucosa material disposed along at least a portion of said luminal surface of said stent structure thereby fully covering a luminal side of said radial opening;

a second graft layer of small intestine submucosa material disposed along at least a portion of said abluminal surface of said stent structure thereby fully covering an abluminal side of said radial opening;

wherein said first graft layer and said second graft layer are secured together through a portion of said radial opening by thermal bonding without sutures.

29. The stent-graft assembly according to claim 28, wherein said thermal bonding comprises welding.

30. The stent-graft assembly according to claim 28, further comprising an unattached margin whereby said first and second graft layers are not secured to each other, wherein said unattached margin is disposed between said thermal bonding and an edge of said radial opening, a size of said thermal bonding being less than a size of said unattached margin, thereby allowing said first and second graft layers to move relative to said stent.

31. The stent-graft assembly according to claim 28, wherein said first graft layer covers substantially all of said luminal surface of said stent structure and said second graft layer covers substantially all of said abluminal surface of said stent structure.

32. The stent-graft assembly according to claim 28, wherein said thermal bonding comprises welding; and further comprising an unattached margin whereby said first and second graft layers are not secured to each other, wherein said unattached margin is disposed between said thermal bonding and an edge of said radial opening, a size of said thermal bonding being less than a size of said unattached margin, thereby allowing said first and second graft layers to move relative to said stent.

33. The stent-graft assembly according to claim 32, wherein said first graft layer covers substantially all of said luminal surface of said stent structure and said second graft layer covers substantially all of said abluminal surface of said stent structure.

34. The stent-graft assembly according to claim 28, wherein said first graft layer covers substantially all of said luminal surface of said stent

structure and said second graft layer covers substantially all of said abluminal surface of said stent structure; and further comprising an unattached margin whereby said first and second graft layers are not secured to each other, wherein said unattached margin is disposed between said thermal bonding and an edge of said radial opening, a size of said thermal bonding being less than a size of said unattached margin, thereby allowing said first and second graft layers to move relative to said stent.